FKR-1 / KS-7, S-2 / 4K-87 - SSC-2 SALISH / SAMLET

DATA FOR 2025 (in progress)
FKR-1 "Meteor" / KS-7 - SSC-2A SALISH
S-2 "Sopka" / KS-2 / 4K-87 - SSC-2B SEPAL
★★★

Frontline cruise missile / coastal anti-ship missile system. The FKR-1 missile was developed by Branch No. 1 of OKB-155 (now MKB Raduga), Chief Designer - A. Ya. Bereznyak. The Meteor complex with the FKR-1 missile was developed by KB-1 of the USSR Ministry of Radio Industry.

Development. In early 1953, the USSR Ministry of Aviation Industry proposed creating an anti-ship coastal missile system based on the KS-1 aircraft missile . On February 19, 1953, by Resolution of the Council of Ministers of the USSR No. 531-571, work on the creation of the Shtorm coastal missile system by the Design Bureau of Plant No. 293 under the supervision of M. R. Bisnovat was terminated. Work on the creation of such a complex was actually started by KB-1 in the same year - on the creation of the Strela coastal weapons system with the 4K-87 missile. The KS carrier aircraft station was installed on a van. In early 1954, the first samples of the new complex's radio equipment were manufactured. The equipment was installed at a proving ground in the area of Cape Fiolent in Krum. Flights of fighters equipped with the missile's onboard equipment began. The development of the Strela coastal missile complex was started by order of the USSR Council of Ministers No. 3346/RS dated 21.04.1954. S.F. Matveevsky was appointed Chief Designer of the Strela complex at KB-1. The Strela complex was designed with a fixed launcher.

The development of the FKR-1/KS-7 frontline cruise missile with a nuclear warhead to destroy ground targets based on the KS-1 air-to-ground missile was initiated by Resolution of the USSR Council of Ministers No. 864-372 of May 11, 1954. The chief designer of the Meteor weapons system at KB-1 was Ya. I. Pavlov. The development was carried out taking into account the experience of creating and based on the Strela anti-ship missile complex with the replacement of the guidance equipment with the Meteor equipment with NB equipment and AP-M autopilot.

On October 30, 1954, Resolution No. 2544-1226 of the USSR Council of Ministers was issued on the development of the Kolchan shipborne missile system with KSS missiles.

Resolution of the USSR Council of Ministers No. 2004-1073 on the creation of the coastal mobile complex "Sopka" with KS-2 / KSS missiles (also known as "Kometa-Snaryad-Strela", "Korabelnyy Snaryad Strela") was issued on December 1, 1955. In 1956-1957, the first prototypes of the KS missile with KS-TG thermal homing heads were produced at the OKB-155 plant in Dubna, and in 1957-1958 - KSS-TG. Based on the Strela cruise missile, in accordance with Resolution of the USSR Council of Ministers No. 2004-1073 of December 1, 1955, the S-2 "Sopka" mobile anti-ship complex was created.

Frontline cruise missile FKR-1/KS-7, Cuban Missile Crisis Museum in Havana, Cuba, 2009 (photo - Martin Trolle, https://ru.wikipedia.org).

Author: DIMMI Created: 08.04.2025 23:36:06 Comments: 1 READ THE FULL ARTICLE

Complex 2K17, missile S-5 / FKR-2 / 4K-95 - SSC-1A SHADDOCK

DATA FOR 2025 (standard update)
2K17 Complex, S-5 / FKR-2 / 4K-95 missile - SSC-1A SHADDOCK
2K17M Complex, S-5M / FKR-2M / 9M78 missile - SSC-1A SHADDOCK
★★★

A frontline cruise missile with a self-propelled launcher. The missile and the complex were developed by OKB-52 (now the Machine-Building Design Bureau), chief designer V.N. Chelomey. The development of a ground-based complex using the P-5 sea-based missile was started in 1958 with the support of N.S. Khrushchev, to whom V.N. Chelomey demonstrated a sketch of a missile launched from an automobile launcher at the Kapustin Yar proving ground in the fall of 1958.

The following cooperation between enterprises was formed during the development of the complex:
OKB-52 - lead design bureau for the complex and the missile;
NII-923 GKAT - missile control system;

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GSKB-47 - missile high-explosive warhead;
NII-125 - missile booster solid propellant charges;
Plant No. 476 GKAT - self-propelled launcher;
Plants No. 292 (Saratov), No. 47 (Orenburg), No. 99 (Ulan-Ude) - serial production of S-5 missiles.

Two prototypes of 2P30 launchers on the ZiL-135K chassis were first shown at the parade on Red Square in Moscow on May 1, 1959. The first test launch of the missiles was carried out at the Kapustin Yar test site on July 21, 1960. The second launch of the S-5 missile was carried out a few days later at the end of July 1960 in the same place in the presence of N.S. Khrushchev and Defense Minister R.Ya. Malinovsky.

This launch is described in the literature as follows: "The eight-wheeled ZiL-135K drove dashingly past the tribune with the high-ranking guests, and then, turning sharply, moved across virgin soil to its designated launch site. While the management was watching other "numbers" of the program, the launch team, headed by Sergei Khrushchev (Khrushchev's son), feverishly prepared the rocket for launch. And, as luck would have it, at the moment of launching the cruise engine, the on-board connector connecting the rocket to the launcher came off twice. Finally, the on-board connector latched, and the rocket launched successfully."

State tests of the 2K17 complex with the S-5 rocket were completed in October 1961 after five rocket launches. The 2K17 frontline missile system with the 4K-95 (FKR-2) missile was adopted by the Soviet Army by Resolution of the USSR Council of Ministers No. 1182-52 of December 30, 1961. The 2K17 missile system was withdrawn from service in 1975.

2P30 launchers of the 2K17 complex with FKR-2/S-5 missiles at a parade on Red Square in Moscow, May 1, 1959 (photo by the USSR Ministry of Defense)

Author: DIMMI Created: 01.05.2024 19:37:42 Comments: 1 READ THE FULL ARTICLE

R-11/8A61, R-11M/8K11 - SS-1B SCUD-A

DATA FOR 2025 (standard update)
Missile R-11 / 8A61 "Earth" - SS-1B SCUD-A
Rocket R-11M/8K11/8K11M - SS-1B SCUD-A/KY-01
Missile R-11MU / 8K12 (project)
R-150/R-170 missile - export version
★★★★

Operational-tactical missile / missile system with an operational-tactical missile. Development of the 8A61 single-stage missile on high-boiling propellant components with a shelf life in the fueled position of up to 1 month was started at NII-88 under the research project topic N2 "Research of long-range missile variants using fuels based on high-boiling oxidizers" in accordance with the Resolution of the Council of Ministers of the USSR No. 4811-2092 of December 4, 1950 "On the plan for experimental work on ground-based rocket weapons for the fourth quarter of 1950 and 1951". The development was carried out at OKB-1 of NII-88 under the general supervision of S.P. Korolev (chief designer - M.K. Yangel, leading designer in 1950-1953 Evgeny Vasilyevich Sinilshchikov, since spring 1953 - V.P. Makeyev). It was planned that by the end of the first quarter of 1952, the selection of optimal fuel formulations based on high-boiling oxidizers would be completed and their physical and chemical studies would be conducted, and various rocket variants would be analyzed and the most optimal variant using R-1 and R-2 rocket units and assemblies would be substantiated, a tactical and technical assignment for a liquid-propellant rocket engine would be prepared, a preliminary design of a liquid-propellant rocket engine in accordance with the tactical and technical assignment, and a preliminary design of a rocket would be developed (*source - Postnikov*) .

The N2 R&D work on a rocket using high-boiling propellant components was based on the results of research into fuels at Research Institute No. 4 of the USSR Academy of Artillery Sciences, which had been conducted since 1947 by the institute's employees A.Z. Krasnov, V.N. Kulagin, I.I. Polyakov, and L.M. Edmin. Kerosene was used as fuel, and the following compositions were used as an oxidizer: a mixture of nitric acid with nitrogen tetroxide and a mixture of tetranitromethane with nitrogen tetroxide. Tests showed that both oxidizers were equivalent in terms of energy. But since tetranitromethane was inferior to nitric acid in a number of characteristics (freezing point, toxicity, and explosiveness), and its production in the early 1950s was not provided with a raw material base, it was recommended to use an oxidizer based on nitric acid to create liquid ballistic missiles (*source - Postnikov*).

The missile was created using work experience and test results, as well as on the basis of design elements of domestic analogues of the German V-2 and Wasserfall missiles . The preliminary design of the R-11 missile was completed at NII-88 on November 30, 1951. **The development of the R-11 missile design** and preparation for serial production at the SKB-385 plant in Zlatoust, Chelyabinsk Region, were fully **initiated by Resolution of the USSR Council of Ministers No. 442-212ss of February 13, 1953,** "On the plan for experimental design work on long-range missiles for 1953-1954". The resolution established the technical specifications for the design of a new ballistic missile and determined the deadlines for creating an experimental batch of 10 missiles. NII-88, headed by M.K. Yangel, and SKB-385, headed by E.M. Ushakov, were approved as the prime contractors. S.P. Korolev was appointed Chief Designer, V.P. Mishin and M.I. Duplishchev were his deputies. The development of the main units of the ballistic missile was carried out by teams led by: A.M. Isaev (propulsion system); N.A. Pilyugin (control system and launch electrical equipment); V.P. Barmin (special technical equipment). Korolev entrusted work on the R-11 missile entirely to V.P. Makeev, and I.V. Popkov was appointed his deputy. Deputy for the propulsion system - E.V. Sinilshchikov.

Special thanks to "Pensioner" (http://russianarms.ru) and other veteran rocket scientists for their assistance in preparing the materials.

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SPU 8U218 with R-11M/8K11 missile at the November parade on Red Square in Moscow, late 1950s-early 1960s (http://www.haaretz.co.il/).

Author: DIMMI Created: 23.03.2009 00:51:36 Comments: 95 READ THE FULL ARTICLE

R-36 / 8K67 - SS-9 SCARP

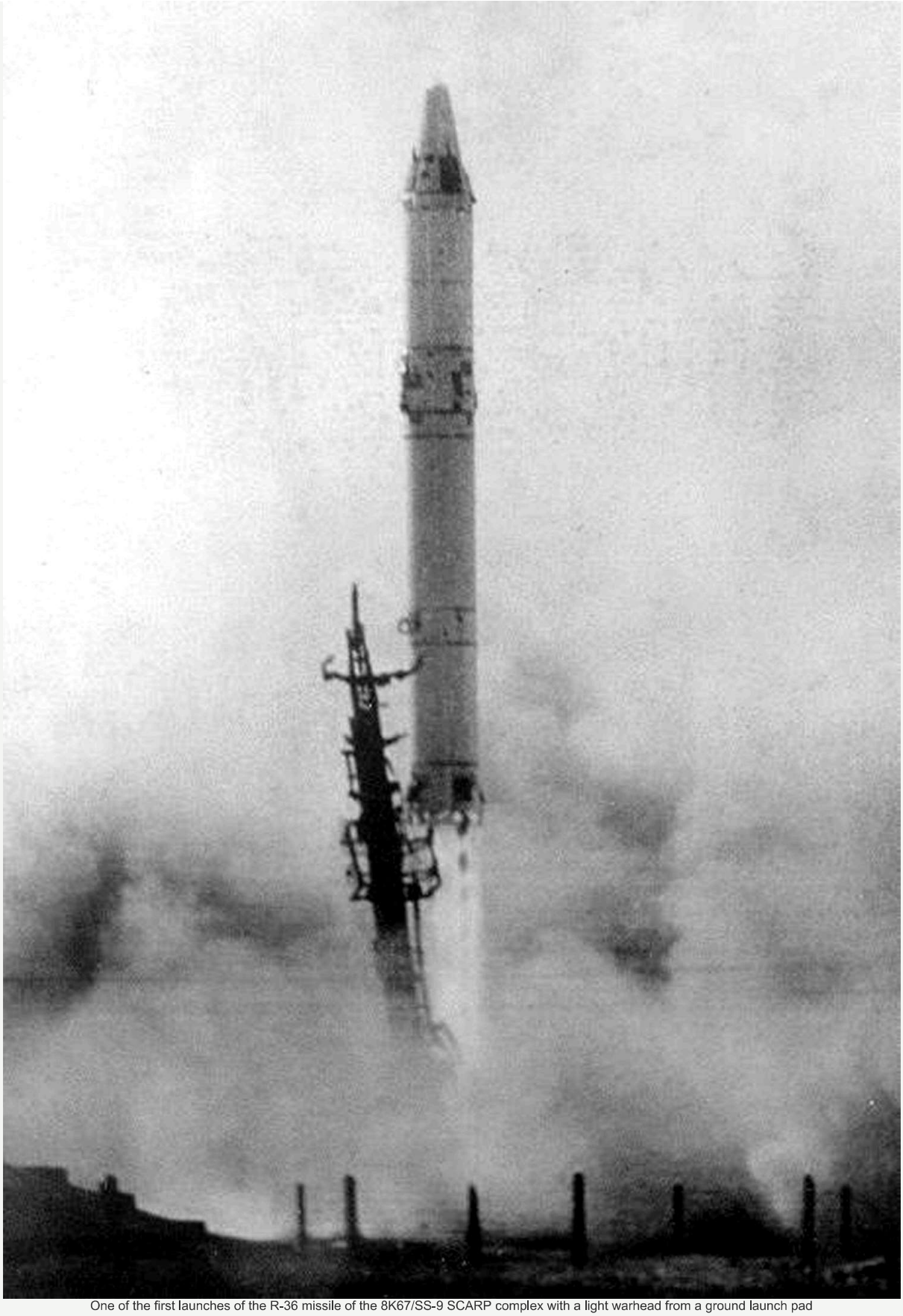
DATA AS OF 2025 (standard replenishment)
8P767 complex, R-36 / 8K67 - SS-9 mod.1 / mod.2 SCARP missile
8P767P complex, R-36P / 8K67P - SS-9 mod.4 SCARP missile Second-generation
★★★★

heavy intercontinental ballistic missile (ICBM). The missile was developed by OKB-586 (since 1966 - Yuzhnoye Design Bureau, Dnepropetrovsk, General Designer - M.K. Yangel). After the appearance of the Titan-2 heavy ICBM in the USA, OKB-586 in the first half of 1961 came up with an initiative to create a new heavy ICBM based on the R-16 ICBM with characteristics superior to the Titan-2. The development of the missile was assigned by Resolution of the Council of Ministers of the USSR No. 346-160ssov "On the most important developments of intercontinental ballistic and global missiles and carriers of heavy space objects" dated 16.04.1962. The resolution gave the start to the development of three versions of the missile: intercontinental, orbital and space. As an ICBM with two types of special charges, the R-36 was to have a range of 12,000 km with a heavy warhead and 16,000 km with a light warhead. It was planned to begin flight tests of the R-36 ICBM in the 4th quarter of 1963, and to begin tests of the orbital version of the missile in the 3rd quarter of 1964 (*source - Gorbulin*). The decisions of the April Resolution were specified in Resolution of the USSR Council of Ministers No. 1021-436ss dated 12 May 1962. Deputy General Designer of the Yuzhnoye Design Bureau M.I. Galas was appointed the lead designer of the missile.

During the creation of the R-36 ICBM, the following cooperation of enterprises was created:
- OKB-586 - the 8P767 complex as a whole, the missile and the steering engines of the cruise stages
- Plant No. 586 - the manufacture of missiles for experimental testing and subsequent series
- OKB-456 - cruise engines of both stages
- NII-692 ("Khartron") - the missile control system and ground-based test and launch equipment
- NII-885 - the radio correction system
- NII-944 under the direction of V.I. Kuznetsov (now the Academician V.I. Kuznetsov Research Institute of Microwave Engineering) - command gyro devices
- KB-11 (VNIIEF) - special charges and automatic warheads
- OKB-586 - missile defense penetration system
- TsKB-34 - silo launcher and missile system command post
- KBTHM - missile system refueling system
- NIIAP - combat control system

The main features of the R-36 / 8K67 heavy ICBM:
- two types of single-block warheads with a missile defense penetration system (KSP PRO);
- an autonomous control system that allows remote control of the missile launch from the silo with the missile turn to the desired azimuth after leaving the silo, which ensures missile aiming at any azimuth;
- the use of nitrogen tertoxide as an oxidizer;
- tight arrangement of the 2nd stage fuel compartment - a single fuel compartment with separation of the oxidizer and fuel by an intermediate bottom;
- the use of pressed chemically milled panels and hollow frames in the design of the fuel tanks ensured weight savings;
- hot pressurization of the fuel tanks is performed from gas generators operating on components of the main fuel;
- to eliminate weightlessness, the launch of the 2nd stage cruise engine is carried out with the steering engine of the stage launched in advance;
- due to the ampulization of the fuel system, a long shelf life and high combat readiness of the missile are ensured;
- the survivability of the missile system during the first strike is increased due to the dispersal of the OS-type silos.

The decrees specified the creation of a heavy ICBM with a combined control system - autonomous inertial with radio correction. The missile was intended to hit especially important targets with powerful thermonuclear charges used in combination with a set of means to overcome enemy missile defense systems. Until 1965, the ICBM was created in competition with the heavy ICBM UR-200 of Chelomey's OKB-52. When designing the missile, a number of design solutions were used, tested and proven on the first-generation R-16 and R-16U heavy missiles , as well as on the R-26 missile. It was supposed to use missiles from group silos - in 1963, this deployment option was rejected and construction of single OS-type silos began at the Baikonur test site.



One of the first launches of the R-36 missile of the 8K67/SS-9 SCARP complex with a light warhead from a ground launch pad
(processed by MilitaryRussia.ru)

Author: DIMMI Created: 28.03.2021 18:48:10 Comments: 0 READ THE FULL ARTICLE

R-5/8A62, R-5M/8K51 - SS-3 SHISTER

DATA FOR 2025 (standard update)
R-5/8A62 - SS-3 SHISTER
R-5M / 8K51 - SS-3 SHISTER

Medium-range ballistic missile (MRBM). Lead developer - OKB-1 (since May 1950 a subdivision of NII-88) under the supervision of S.P. Korolev. Various design teams participated in the development of the missile and complex systems:
- OKB-1, Chief Designer - S.P. Korolev, leading designers - D.I. Kozlov and I.P. Rumyantsev - development of the missile and the complex as a whole;

- OKB-456, Chief Designer V.P. Glushko - the missile engine;
- NII-885, Chief Designer N.A. Pilyugin - the control system and ground-based test and launch equipment ;
- GSKB Spetsmash, Chief Designer V.P. Barmin - ground-based launch and other equipment ;
- NII-10, Chief Designer V.I. Kuznetsov - command devices . The development was started as a continuation of the

R-3 missile project in 1951. Proposals for the creation of a new missile were submitted to the USSR Ministry of Armaments by S.P. Korolev on October 20, 1951. The draft design was submitted on October 30, 1951. R&D work on the creation of the R-5 missile was assigned by the Resolution of the USSR Council of Ministers of February 13, 1952. Production of experimental missiles was carried out by the experimental production of NII-88 - Plant No. 88. The Resolution of the USSR Council of Ministers on conducting flight design tests of the R-5 missile in three stages was issued on February 13, 1953 - the first and second stages, the third sighting stage and the test tests. At the test stand of Branch No. 2 of NII-88 in Zagorsk in 1953, before the start of the sighting tests, 4 firing test bench tests of the R-5 missile were conducted.

Launch complex with R-5M missile. Kapustin Yar test site, apparently 1956-1958 (from the publication of the Ministry of Defense for the 70th anniversary of the test site, source).

Author: DIMMI Created: 09/08/2009 22:15:54 Comments: 49 READ THE FULL ARTICLE

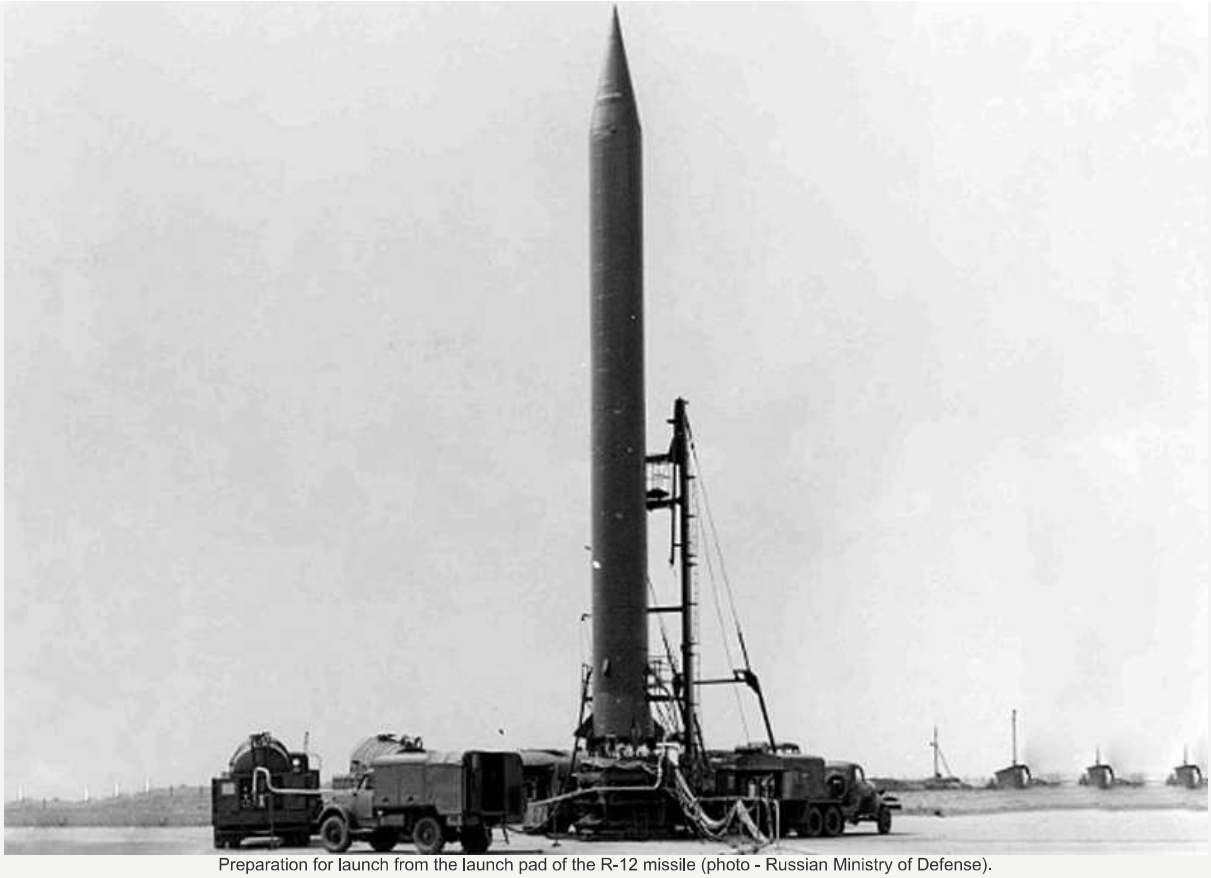
R-12 / R-12U - SS-4 SANDAL

DATA FOR 2025 (standard update)
Rocket R-12 / 8A63 / 8K63 - SS-4 SANDAL
Rocket R-12U "Dvina" / 8K63U - SS-4 SANDAL
★★★★

Medium-range ballistic missile. Work on the design of missiles on high-boiling components (i.e. liquid at operating temperature) with a shelf life in the filled position of up to 1 month was started at NII-88 on the topic of R&D N2 by the decree of the Council of Ministers of the USSR dated December 4, 1950 under the general supervision of S.P. Korolev. On the N2 topic, studies were conducted on the possibility of using high-boiling fuel components for long-range missiles, in particular nitric acid and kerosene. Using the developments of NII-88, on an initiative basis, SKB-586 under the supervision of V.S. Budnik began developing a project for a missile on high-boiling components at the end of 1952. The missile was designed for the use of tooling, using the developments on the R-5M missile and practically in its dimensions. The work was based on two postulates: the missile should have an autonomous control system without radio correction and should remain fully combat-ready for a long time in a fueled state. The Main Artillery Directorate of the USSR Ministry of Defense supported the initiative development.

Resolution of the USSR Council of Ministers No. 442-212 of February 13, 1953 assigned the creation of the 8A63 missile to SKB-586. Order of the USSR Minister of Armaments No. 134 on the start of work was issued on February 20, 1953. The tactical and technical requirements for the 8A63 missile were received by the design bureau on April 14, 1953. By December 25, 1953, the preliminary design of the missile was protected and the manufacture of its individual units began, but funding for SKB-586's work on the new missile was not carried out in 1953. The following were subcontractors of SKB-586: for the engine - OKB-456 (Glushko), for control systems - NII-885 (Pilyugin), for gyroscopic instruments - NII-10 (Kuznetsov), for the launch position - GSKB "Spetsmash" (Barmin).

Special thanks to ABL22 (http://militaryrussia.ru/forum) for assistance in working on the material.



Preparation for launch from the launch pad of the R-12 missile (photo - Russian Ministry of Defense).

Author: DIMMI Created: 30.07.2010 02:02:04 Comments: 71 READ THE FULL ARTICLE

R-2 - SS-2 SIBLING

DATA FOR 2024 (standard update)
Rocket R-2 / 8Zh38 - SS-2 SIBLING
★★★★

A long-range ballistic missile. According to a later classification system, it is classified as an operational-tactical missile due to its range . It was developed based on the R-1 missile and using developments in modifying the V-2 missile (Germany) at NII-88 under the supervision of S.P. Korolev, lead designer - Mikhail Yangel. Development of the missile began in 1946. The project is based on the possibility of increasing engine thrust to 35,000 kg and increasing the capacity of the fuel tanks to achieve a range of 600 km while maintaining the diameter of the body and stabilizers of the V-2 missile. Five project options were developed during the preliminary design process. The final version provided for lengthening the missile by 1.9 m in the cylindrical section, forcing the engine and using an inseparable warhead. By the end of 1946, a preliminary design, explanatory note and three prototypes of the R-2 missile were prepared.

The defense of the draft design took place in April 1947 under the chairmanship of the USSR Minister of Armaments D.F. Ustinov. It was decided to refine the design - to use a detachable warhead, load-bearing tanks and to remove the aerodynamic stabilizers. By the end of 1947, the second version of the design was prepared - R-2E - with a load-bearing fuel tank and stabilizers. For bench tests, a rig for testing the rocket in a vertical position with a full check of the onboard automation was created at the control and test station of Plant No. 88. Static and dynamic tests of the R-1 rocket designs were conducted in 1949-1951 by the Rocket Design Strength Department of NII-88 - the future TsNIIMash.

Monument to the R-2 rocket in Korolev, 2003 (photo - Nesusvet, http://ru.wikipedia.org)

Author: DIMMI Created: 07.09.2009 23:50:33 Comments: 30 READ THE FULL ARTICLE

RS-12M Topol, RT-2PM missile / 15Zh58 - SS-25 SICKLE

DATA AS OF 2025 (standard replenishment)
RS-12M / 15P158.1 / 15P158 Topol complex, RT-2PM / 15Zh58 missile - SS-25 SICKLE / PL-5
★★★★

Intercontinental ballistic missile (ICBM) / road-mobile missile system (PGRK). Preliminary development of the complex design was carried out since 1975 by the Moscow Institute of Thermal Engineering (MIT) under the supervision of Alexander Davidovich Nadiradze on the basis of the Temp-2S ICBM - SS-16 SINNER and the Pioneer IRBM - SS-20 SABER . Chief Designer since 1987 - Boris Lagutin (until 1993). The development of the Topol ICBM for use as part of the PGRK was initiated by Resolution of the USSR Council of Ministers No. 544-166 of July 20, 1975. The next Resolution of the USSR Council of Ministers on the development of the Topol complex with solid-fuel ICBMs No. 668-212 was issued on July 19, 1976. The resolutions provided for the following cooperation of enterprises to create the complex:
- MIT - lead for the complex and the missile
- NIIAP - ICBM control system
- Titan Central Design Bureau of the Barrikady Plant (Volgograd) - development of the self-propelled launcher of the PGRK
- Motor Design Bureau - special PGRK vehicles
- Minsk Automobile Plant - PGRK chassis and auxiliary vehicles of the complex
- Arsenal Design Bureau (Kiev) - sighting equipment
- VNIIEF - thermonuclear warhead

In 1979 In 1982, the development of charges for the second and third stage rocket engines began at the Pavlograd Chemical Plant (source).

The first ICBM launch from a specially equipped silo was carried out at the Kapustin Yar test site on October 27, 1982. Probably, one of the objectives of the launch was to check the operation of the launch systems and the exit of the missile from the TPK with the subsequent launch of the main engine of the first stage. The launch was unsuccessful. Flight design tests (FDT) of the 15Zh58 ICBM began with a launch from a converted silo at the Plesetsk test site on February 8, 1983. The launch was completely successful. A total of 12 launches under the FDT program took place in 1983-1984. All launches were carried out at the Plesetsk test site. The test launch of the LKI program took place on November 20, 1984.

Serial production of the Topol missile system was launched by Resolution of the USSR Council of Ministers No. 1275-3400 dated December 28, 1984 (*history - Strategic missiles*), although the development of serial production of ICBMs had been carried out by the Votkinsk Plant since the late 1970s. The missile was serially produced by the Votkinsk Machine-Building Plant since 1985. Self-propelled launchers of the system were produced by the Barrikady Plant (Volgograd). In 1984, construction of fixed basing facilities and equipment of combat patrol routes for the PGRK began. The facilities were located in those divisions of the Strategic Missile Forces where the RT-2P, MR-UR-100 and UR-100N ICBMs were removed from combat duty.At the same time, the PGRK complex was deployed in the positional areas of the Pioneer MRBM (*historical - Strategic missile*).

The first division of the 15P158.1 Topol PGRK entered combat duty on July 23, 1985 as part of the Strategic Missile Forces regiment in Yoshkar-Ola, Mari Autonomous Okrug of the USSR (source). By the end of 1985, another PGRK (*source - Strategic Missile*) division entered combat duty. The first Strategic Missile Forces regiment with RS-12M missiles, equipped with the Barrier mobile regimental command post (source), was put on combat duty on April 28, 1987 in the Nizhny Tagil area, and on May 27, 1988, the first missile regiment with the modernized Granit mobile regimental command post (source) was put on combat duty, based in Irkutsk (source). The Topol ICBM complex **was accepted into service by the USSR Strategic Missile Forces on December 1, 1988** (source).

Since 1997, the RS-12M ICBM has been gradually replaced by the RS-12M2 Topol-M and RS-24 Yars ICBMs . By the end of 2021, the Topol complex was completely removed from combat duty.

APU 15U168 of the 15P158 "Topol" complex during the training of graduates of the Serpukhov Military Academy of the Strategic Missile Forces, published on 12.12.2013 (photo - Konstantin Semenov, http://tvzvezda.ru/).

Author: DIMMI Created: 03.11.2011 17:27:39 Comments: 283 READ THE FULL ARTICLE

9K79 Tochka - SS-21 SCARAB

DATA FOR 2025 (standard update)
9K79 "Tochka" complex, 9M79 / OTR-21 / 9M79M - SS-21A SCARAB-A / FROG-9 missile
Tochka-R complex, Tochka-R missile 9M79R / 9M79FR
Complex 9K79-1 "Tochka-U", missile 9M79-1 / 9M791 - SS-21B SCARAB-B
Complex 9K79M (?) "Tochka-M" - SS-21C SCARAB-C
★★★★★

Division (tactical) missile system. Development of the system in the Design Bureau of Mechanical Engineering (Kolomna) was started in 1967 after the documentation of the preliminary design of the Tochka system with the V-614 missile from the Fakel Design Bureau was transferred to the Design Bureau. Unlike the Fakel Design Bureau's Tochka, the KBM Tochka had modified wings and aerodynamic control surfaces, the destabilizer was removed, and other systems of the missile were modified. Chief Designer: S.P. Nepobedimy.

Full-scale development was assigned by Resolution of the USSR Council of Ministers No. 148-56 dated March 4, 1968. 120 enterprises were involved in the development and production of the missile system. The following cooperation of enterprises was formed:
- Design Bureau of Mechanical Engineering (Kolomna, S.P. Nepobedimy) - the system and the missile;
- TsNIIAG (chief designers - B.S. Kolesov and A.S. Lipkin) - control system of the complex and the missile;
- NPO Elektromekhanika (Miass) - command and gyroscopic device;
- PO Plant Arsenal (Kiev) - aiming system;
- VNII Signal (Kovrov) - topographic reference and navigation system;
- NPO Soyuz (director - academician B.P. Zhukov) - solid propellant rocket motor charges
- Design Bureau of the Barrikady Plant (Volgograd, chief designer - G.I. Sergeev) - self-propelled launcher and transport and loading vehicle
- Bryansk Automobile Plant (BAZ) - chassis for the SPU and TZM;
- NPO Energia (Voronezh) - onboard turbogenerator power source of the SPU;
- NIMI (Moscow) - high-explosive warhead;
- KB-11 (VNIIEF, Arzamas-16) - nuclear warheads for the missiles of the complex.

The production of the complex's assets was planned:
- KBM - prototypes of missiles;
- Petropavlovsk Heavy Machinery Plant (PZTM) - assembly and production of missiles, production of the AKIM complex;
- Votkinsk Machine-Building Plant - production of 9M79 missile components.
- Barrikady Plant (Volgograd) - production of the SPU and TZM of the complex.

To resolve the issues of missile launch, KBM developed a special test missile projectile (IRS) with a propulsion system designed for a short operating time, that is, a size-weight copy of the missile and a mock-up launcher. The results of the IRS launches formed the basis for resolving a number of issues related to the missile and the launcher. Until 1973, prototypes of missiles were manufactured by KBM.

Factory tests of the missile began in 1971 (the first two launches) at the Kapustin Yar test site (launches from the test site PU developed by KBM, preparation for testing began at the test site in January 1970). Production of prototypes of the SPU and TZM complex was carried out by the Barrikady plant (Volgograd) on chassis manufactured by the Bryansk Automobile Plant. In 1973, serial production of the Tochka missiles (later - Tochka-U) began at the Votkinsk Machine-Building Plant (VMZ, casting of cases, instrument and tail sections) and at the Petropavlovsk Heavy Machine-Building Plant (PZTM, mechanical processing of cases, manufacture of engines and gas generators of on-board power sources - they were equipped at VMZ, since the PTZM initially did not have a base for working with solid fuel) .

State tests of the complex were conducted in 1973-1974 (Kapustin Yar, Transbaikalia, Turkestan Military District, Transcaucasian Military District).

Special thanks to "Pensioner" (http://russianarms.ru/) for assistance in preparing materials.

Missile systems 9K79-1 "Tochka-U" with missiles 9M79M "Tochka" during the exercises of missile and artillery units of the 5th combined arms army of the Eastern Military District, Sergeyevsky combined arms range, March 2013. The launch of missiles 9M79M "Tochka" was conditional. (http://pressa-tof.livejournal.com).

Author: DIMMI Created: 06.04.2009 23:39:23 Comments: 252 READ THE FULL ARTICLE

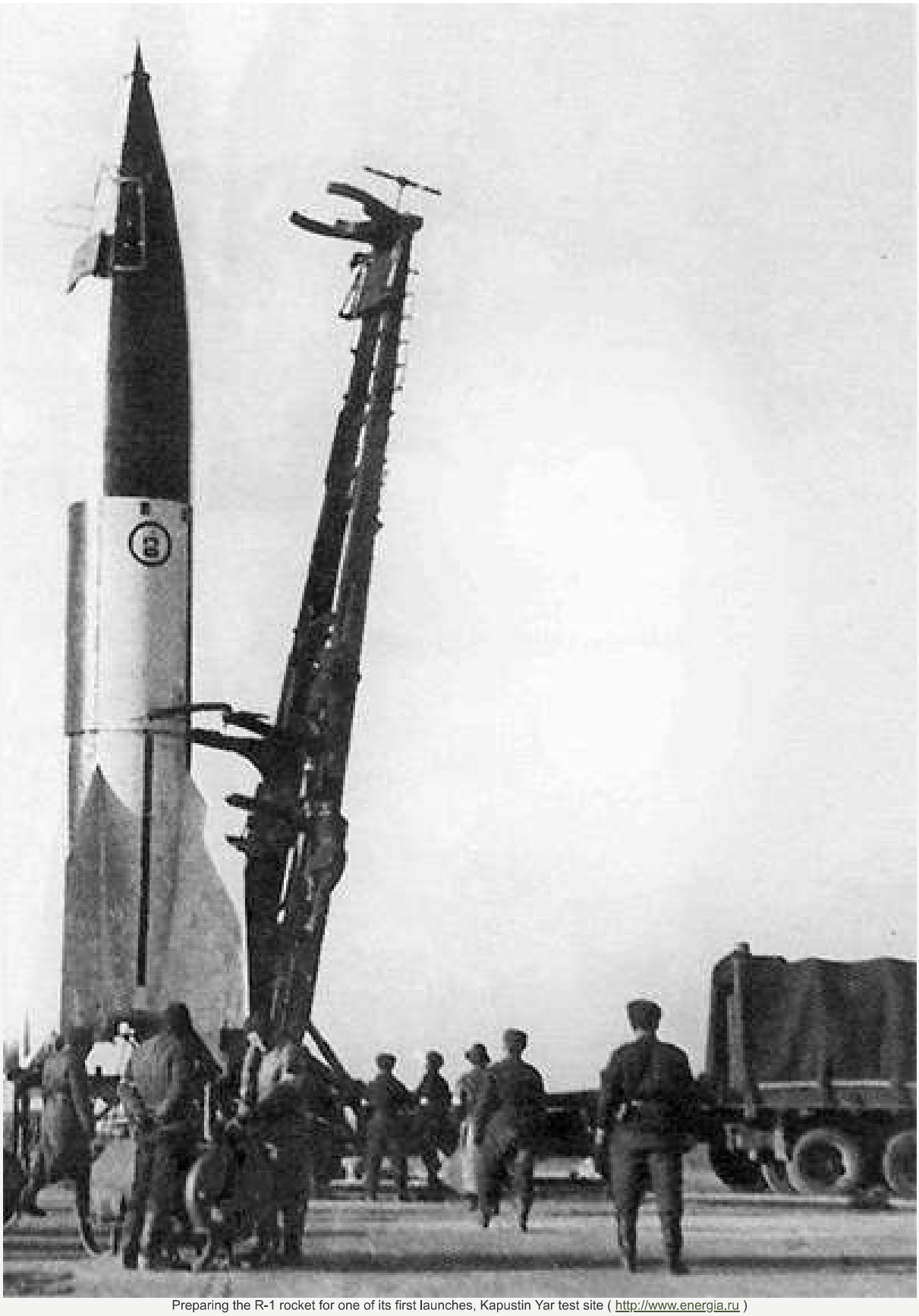
R-1 / 8A11 Pobeda - SS-1 SCUNNER

DATA FOR 2022 (standard update)
R-1 "Pobeda" 8A11 - SS-1 SCUNNER
Product "N" (V-2)
Product "T" (V-2)
★★★★

The first domestic long-range ballistic missile. According to the modern classification system, it belongs to operational-tactical missiles . It was developed on the basis of the A-4 / V-2 rocket (Germany) at the Research Institute-88 under the supervision of S.P. Korolev and, in fact, is a complete analogue of its German and domestic assembly. By the Decree of the State Defense Committee of the USSR No. 9475 of July 8, 1945, a commission was created to study and master German jet technology. In 1945-1946, under the supervision of Soviet specialists, several Soviet-German institutes and factories were deployed to restore documentation and samples of rocket technology. In July 1945, in Germany, in the city of Bleicherode, the Rabe Institute (headed by B.E. Chertok) was organized to study the rudder control system and other systems of the V-2 rocket.

In February 1946, a Government Commission arrived in Germany, consisting of the Chief of the Main Artillery Directorate Yakovlev N.D. (Chairman), the Minister of Armaments Ustinov D.F., the Chief of the 7th Main Directorate of the Ministry of Armaments Vetoshkin S.I., the Director of the Obukhov Plant Gonor L.R., the Head of the Defense Industry Department of the USSR State Planning Committee Pashkov G.N., and others. After familiarizing themselves with the work of our specialists, the commission organized a meeting at which Ustinov announced the upcoming organizational measures and appointments:
- Ministry of Armaments - lead for missiles with liquid-
propellant rocket engines; - Korolev S.P. - Chief Designer of long-range ballistic missiles
; - Glushko V.P. (OKB-456) - Chief Designer of liquid-propellant
rocket engines; - Ryazansky M.S. (NII-885) - Chief Designer of missile control systems;
- Pilyugin N.A. (NII-885) - Deputy Chief Designer of SU;
- Gonor L.R. – director of the leading research institute;
It was decided to begin work on ballistic missiles with the production of German missiles.

In March 1946, the Nordhausen Institute was created in Peenemünde to study German missile experience. The beginning of work on the creation of the R-1 missile and other types of missiles was laid by Resolution of the USSR Council of Ministers No. 1017-419 "Questions of Rocket Weapons" dated May 13, 1946.



Preparing the R-1 rocket for one of its first launches, Kapustin Yar test site (http://www.energia.ru)

Author: DIMMI Created: 07.09.2009 23:39:35 Comments: 56 READ THE FULL ARTICLE

R-16 / 8K64 - SS-7 SADDLER

DATA AS OF 2025 (standard replenishment)
R-16 / 8K64 - SS-7 mod.1 SADDLER

★★missile R-16U / 8K64U - SS-7 mod.2 SADDLER missile ★

Intercontinental ballistic missile (ICBM). The development of the first (for the design bureau) two-stage missile was carried out by OKB-586 (Yuzhnoye Design Bureau) under the general supervision of Academician M.K. Yangel in accordance with the Resolution of the CPSU Central Committee and the USSR Council of Ministers dated 12/17/1956 on the development of an intercontinental missile on high-boiling propellant components. The lead designer of the missile was V.V. Grachev. The missile was developed due to the low tactical, technical and operational characteristics of the first ICBM R-7 S.P. Korolev . In order to expedite the creation of a new ICBM, it was proposed to widely use the design solutions of the R-12/ 8K63 and R-14/ 8K65 missiles previously

created by the design bureau. The 8K64 ICBM was supposed to be launched only from ground-based launchers. By a decree of 17.12.1956, the Government instructed OKB-586 to develop a design for an ICBM using long-term storage fuel. In February 1957, OKB-586 proposed a pre-draft design for a new ICBM. The design assumed the creation of a 2-stage rocket with conical stages using engines developed by OKB-3 NII-88. The pre-draft design of November 1957 assumed the creation of a 150-ton rocket with cylindrical stages with two base stage diameters - 3 m for the 1st stage and 2.4 m for the 2nd stage. As expected, the high-boiling fuel AK

-27I and UDMH were supposed to be used. A branch of OKB-3 NII-88 was created at Plant No. 586. In mid-1958, the draft design was reviewed by an expert commission created by the government, headed by the President of the USSR Academy of Sciences M. V. Keldysh. The commission confirmed the possibility of creating a rocket with the declared characteristics. The position of OKB-586 was strengthened by its proposal to replace the OKB-3 NII-88 engines, which did not have a production base, with OKB-456 engines of V. P. Glushko, which were based on a two-chamber engine developed for the R-14 rocket. A bundle of three such engines is used at the first stage, and one engine with extended (high-altitude) nozzles at the second. For flight control, each stage is equipped with its own four-chamber steering engine. The use of steering engines made it possible to reduce the final weight of the rocket due to smaller fuel residues and increase the accuracy of fire. The development of steering engines was assigned to the specialized engine design bureau KB-4 in the structure of OKB-586, transformed from the branch of OKB-3 of NII-88 by order of the Chairman of the State Committee on Industrial Safety under the Council of Ministers No. KS-269 of 22.06.1958. I.I. Ivanov became the chief designer of KB-4, and M.D. Nazarov became his deputy.

In August 1958, the Council of Ministers instructed OKB-586 to expand work and create the R-16 ICBM with the index 8K64 in the shortest possible time; revised tactical and technical requirements were issued. In view of the aggravation of the international situation, by the Resolution of the Central Committee of the CPSU and the Council of Ministers of the USSR of May 13, 1959, OKB-586 was obliged to accelerate the development of the R-14 and R-16 missiles and begin flight tests at the end of 1960, and to begin serial production of the missiles from 1962.

To develop the rocket control system, OKB-692 (later NPO Khartron) was formed in Kharkov. To test the combustion chambers and gas generators of the steering engines and the fuel systems of the cruise engines, a complex of stands and an assembly and test building were built at the OKB-586 test base. A laboratory and test building with stands for testing turbopump units was built for the OKB-586 engine design bureau. Sites were allocated for OKB-586 on the territory of the 5th Research Institute of Instrument Engineering in Baikonur, where construction of the 8K64 rocket launch site, an assembly and test building, and a residential area began. The development of launch equipment was entrusted to the Novokramatorsk Machine-Building Plant.

Thus, cooperation was formed:
- OKB-586 (Yuzhnoye Design Bureau) - lead for the complex, rocket, liquid-propellant rocket engine (a separate design bureau in OKB-586), warheads of ICBMs;
- OKB-456 - for sustainer liquid-propellant rocket engines;
- OKB-692 (NPO Khartron) - control system;
- Novokramatorsk Machine-Building Plant - launch equipment for the Sheksna-N ground complex;
- KB-11 (VNIIEF) - thermonuclear charges of warheads.

Launch of an R-16U ICBM from a silo, 16.02.1968 (photo - A. Sergeev, RIA Novosti)

Author: DIMMI Created: 24.06.2013 09:56:59 Comments: 23 READ THE FULL ARTICLE

2K4 Filin - FROG-1

DATA FOR 2025 (standard update)
Complex 2K4 "Filin", missile 3R2 - FROG-1
Missile 3R3 "Filin-2"
Missile 3R4 "Filin-3"
★★★

Tactical mobile missile system / tactical solid-fuel missile. The system was developed by NII-1 (since 1967 - Moscow Institute of Thermal Engineering), chief designer N.P. Mazurov. Testing began in 1955. Testing together with the self-propelled launcher (SPU) 2P4 since 1957. Production of launchers was carried out at the Kirov Plant in 1957-1958 (a total of 36 units were produced). The system was accepted for trial operation in 1957 under the name 2K4, and was never delivered to combat units. The system was accepted for supply to the USSR Armed Forces by the Resolution of the USSR Council of Ministers dated 17.08.1958, and removed from supply by the Resolution of the USSR Council of Ministers in February 1960 due to the completion of work on the Luna system .

Installation of the 2P4 2K4 Filin complex at a parade on Red Square in Moscow, presumably May 1, 1960 (http://russianarms.ru).

Author: DIMMI Created: 04.04.2009 09:07:46 Comments: 28 READ THE FULL ARTICLE

R-14 / R-14U - SS-5 SKEAN

DATA AS OF 2025 (standard replenishment)
Missile R-14 / 8K65 - SS-5 SKEAN
Complex 8P764 "Chusovaya", missile R-14U / 8K65U - SS-5 SKEAN
★★★★

Medium-range ballistic missile. Developed in SKB-586 by General Designer M.K. Yangel in accordance with the Resolution of the USSR Council of Ministers dated July 2, 1958. The missile was designed using the experience of creating the R-12 MRBM with an increased range of 3,600 km and improved operational capabilities.

In the first quarter of 1960, the first hot runs of the R-14 missile were performed. From March 28 to May 1960, four bench tests of the engines were conducted at the Zagorsk Research Institute-229, which passed without any special comments. In the second quarter of 1960, the experimental development of the R-14 was completed and preparations for flight design tests began. To conduct the tests, a technical position was built on site No. 20 of the proving ground, including an assembly and test building, and a launch site for two launches was equipped on site No. 21. The target field was equipped in the area of the city of Bratsk. Major General A.G. Mrykin was appointed Chairman of the State Commission, and Deputy Yangel V.S. Budnik was appointed Technical Director of the tests.

The missile tests began at the State Central Test Site No. 4 Kapustin Yar with a successful launch on June 6, 1960. The results of the first launch revealed abnormal operation of the oxidizer overflow system, and during the first stage of flight tests, the phenomenon of cavitation was discovered, leading to the destruction of the missiles in the active phase of flight. Modifications were made to the design of the missile and on February 15, 1961, flight design tests were successfully completed. A total of 21 launches were made during the flight design tests (22 launches according to other data).

Missile R-14/8K65 during testing (http://rbase.new-factoria.ru).

Author: DIMMI Created: 30.07.2010 23:32:48 Comments: 92 READ THE FULL ARTICLE

RS-24 Yars / Topol-MR - SS-X-29 / SS-29 / SS-27 mod.2 SICKLE-B

DATA FOR 2025 (standard update)
RS-24 Yars / Topol-MR / Universal complex - SS-X-29
RS-24 Yars / 15P155M complex, RS-12M2R / 15Zh55M missile (APU) - SS-29 / SS-27 mod.2 SICKLE-B
RS-24 Yars / 15P165M complex, RS-12M2R / 15Zh65M missile (SHPU) - SS-29 / SS-27 mod.3 SICKLE-S
RS-24 Yars-S complex
RS-24 Yars-M complex
★★★★

Intercontinental ballistic missile (ICBM) / road-mobile missile system (PGRK). The system and the missile were developed by the Moscow Institute of Thermal Engineering (MIT) based on the RT-2PM2 / Topol-M ICBM , chief designer - Yu. Solomonov. Development of the Topol-M / RT-2PM2 ICBM using only Russian technologies began in March 1992. The decree of the President of Russia B.N. Yeltsin on the creation of the Topol-M missile system (with development options) was issued on February 27, 1993.

The first test launch of the Yars 15Zh55M missile was carried out on May 29, 2007 from a mobile launcher at the Plesetsk test site. In 2009, the Titan Central Design Bureau created the first examples of the Yars launch units (source). The missiles of the system are manufactured at the Votkinsk Machine-Building Plant (Votkinsk). According to media reports (2010), the RS-24 missiles will replace the RS-18 and RS-20 ICBMs on duty as their warranty periods expire. In January 2010, it was announced that state tests of the complex would be completed by the end of 2010, or after the 4th and 5th launches. From 2012, only the RS-24 Yars ICBM is planned to remain in serial production. In 2011, it was planned to conduct 3 test launches of the Yars ICBM (media reports from December 2010).

The deployment of the Yars complexes began in December 2009 after the acceptance of the Strategic Missile Forces complex for "experimental combat duty" as part of one missile battalion of the Teikovo regiment of the 54th Guards Missile Division of the 27th Guards Missile Army of the Strategic Missile Forces (based in Krasnye Sosenki, 3 complexes). On November 30, 2010, the Commander-in-Chief of the Strategic Missile Forces, General S. Karakayev, announced that the Strategic Missile Forces would gradually be re-equipped from mobile complexes with Topol-M single-warhead missiles to mobile complexes with Yars MIRVed missiles. In December 2010, the second division of Yars complexes (3 SPUs) entered service with the Teikovo Missile Division. On March 4, 2011, it was announced that the first missile regiment with RS-24 Yars ICBMs had entered combat duty in the Strategic Missile Forces as part of the Teikovo Division. The regiment of the Teikovo Missile Division included 2 missile battalions of RS-24 ICBMs, delivered to the Strategic Missile Forces in 2009-2010. In total, the regiment has 6 RS-24 systems.

All data on the system is presumptive and taken from open sources and the media. The list of sources is attached.

Launch of the RS-24/15Zh55M Yars ICBM from a mobile ground-based missile system during the Grom-2022 strategic forces exercise, Plesetsk training ground, 10/26/2022 (video frame from the Russian Ministry of Defense)

Author: DIMMI Created: 02.12.2010 12:54:24 Comments: 755 READ THE FULL ARTICLE

R-9A / 8K75 - SS-8 SASIN

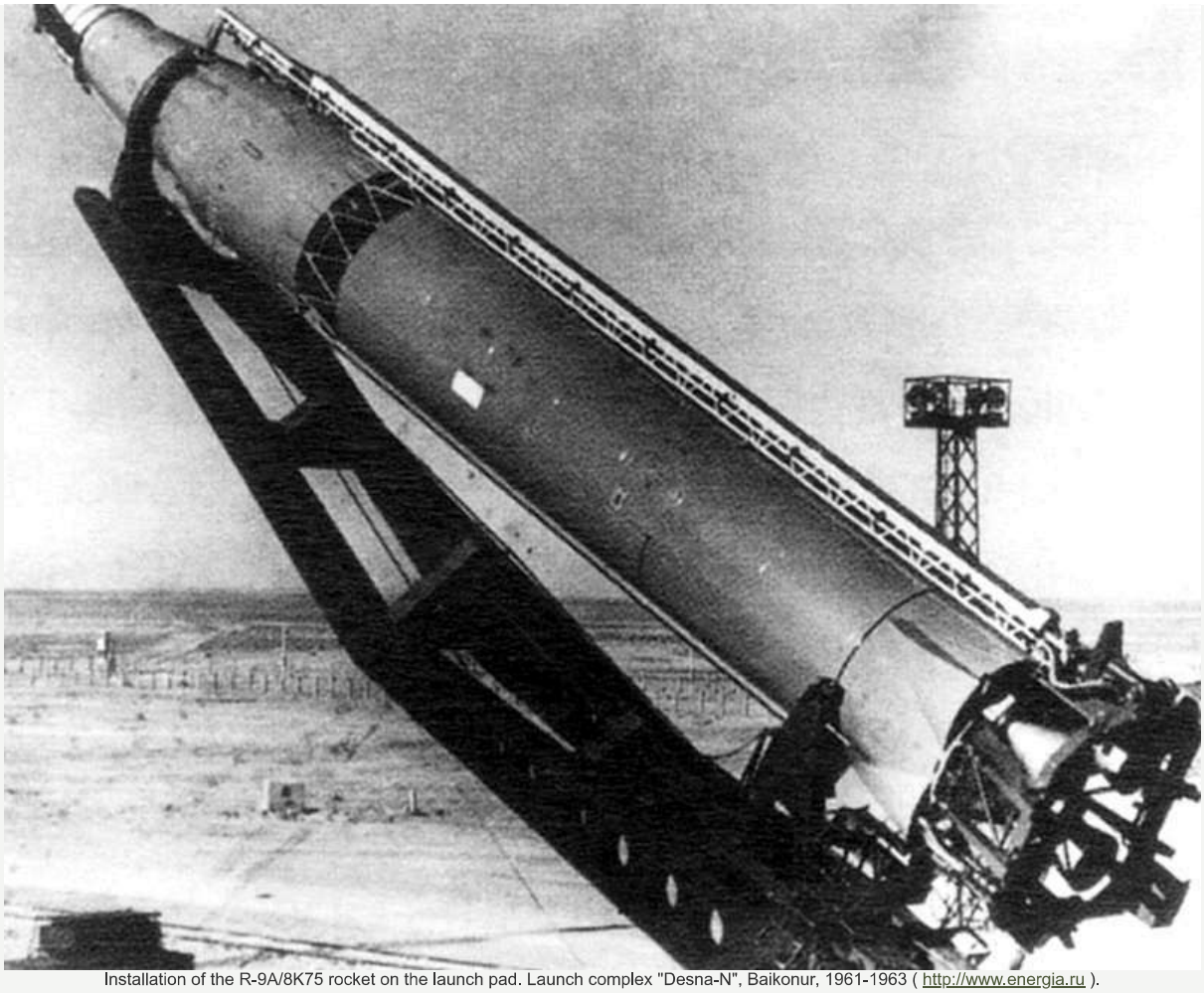
DATA AS OF 2025 (standard replenishment)
Missile R-9A / 8K75 - SS-8 SASIN
R-9B/8K76 Missile
R-9M/8K77
★★★★

Missile Intercontinental ballistic missile (ICBM). After developing new types of reduced-weight nuclear charges, as well as new, more efficient types of liquid-propellant rocket engines, in April 1958 the OKB-1 Council of Chief Designers approached the USSR Government with a proposal to create an R-9 ICBM using oxygen-kerosene fuel with a launch mass of about 100 tons. Initially, two missile designs were considered: R-9A (8K75) using oxygen-kerosene fuel and R-9B (8K76) using kerosene-nitric acid fuel. The R-9A missile design was adopted for final development by OKB-1 - the main reasons were its high energy capabilities and low toxicity of the fuel components.

The development of the missile was started by OKB-1 (General Designer - S.P. Korolev) in accordance with the Resolution of the USSR Council of Ministers dated May 13, 1959. The planned date for putting the missile into service was 1961. During the preliminary design, five basic schemes of the missile were considered, providing the required characteristics with the greatest possible simplicity, mobility and minimum possible weight of the structure. The preliminary design of the missile was completed in October 1959. By this time, the tasks had been issued and agreed upon with all related organizations, a set of working drawings had been released, technological equipment had been manufactured and the production of individual units of the missile had begun. The preliminary design also provided for further improvement of the characteristics of the R-9 missile.

The following cooperation of enterprises was formed during the creation of the 9K75 ICBM:
- OKB-1 (S.P. Korolev) - lead design bureau for the complex and the missile;
- NIIAP (N.A. Pilyugin) - control system;
- NII-944 (V.I. Kuznitsov) - command devices;
- KB-11 (S.G. Kocharyants) - thermonuclear warhead;
- GSKB "Spetsmash" (V.P. Barmin) - launch equipment.

According to the diaries of Korolev's associate - V.P. Mishin - the delay in ICBM tests was caused by the unreadiness of the engines of the sustainer stages developed by V.P. Glushko. Flight design tests of the missile began at the Baikonur test site with a launch on April 9, 1961 - an emergency, an explosion of the first stage. The first successful and second launch overall took place on August 21, 1961 (July 25, 1961 *according to Andreev*). At the first stage, missile tests were conducted by the First Test Directorate of the Baikonur test site, later the tests were moved to site No. 70 of the test site.



Installation of the R-9A/8K75 rocket on the launch pad. Launch complex "Desna-N", Baikonur, 1961-1963 (http://www.energia.ru).

Author: DIMMI Created: 02.06.2013 22:35:22 Comments: 47 READ THE FULL ARTICLE

Complex 96K6 Pantsir-S / Pantsir-S1 - SA-22 GREYHOUND

DATA AS OF 2025 (standard replenishment)
Complex "Roman" / "Pantsir-S1" - SA-X-22
Complex 96K6 "Pantsir-S" / "Pantsir-S1" , missile 57E6E - SA-22 GREYHOUND
Anti-aircraft missile and gun system of the Air Defense of the Russian Air Force. Developed by the Instrument-Making Design Bureau (hereinafter referred to as KBP, Tula), chief designer - Arkady Shipunov (later, as of 2006 - Alexander Rybas). Development of the ZRPK on the topic of the R&D "Roman" by order of the Air Defense of the USSR began in June 1990 as an ZRPK of the Air Defense Forces - it was assumed that the ZRPK would be used as a short-range air defense system to cover the positions of the S-300V and S-300 air defense systems, as well as to cover troop groupings. Later, the ZRPK was also offered to the Ground Forces, Airborne Forces and Navy of Russia. The ZRPK design used the KBP developments for the creation of the 2K22M Tunguska-M ZRPK. The prototype of the Roman / Pantsir-S1 complex was created in 1994 and was first publicly demonstrated at the MAKS-1995 air show. In the context of reduced funding for equipment purchases, the performance characteristics and capabilities of the Roman ZRPK (firing from a stationary position, performance characteristics for range, radar capabilities) did not satisfy the customer. Beginning in 2000, partial funding for the development of the ZRPK was provided by the United Arab Emirates. By 2005, the prime customer of the ZRPK was the Russian Air Force. The purpose of the modernized complex is close air defense of stationary objects (including long-range air defense systems) from air attack weapons. The need of the Russian Air Force is estimated at 100 complexes. After several upgrades, in 2006, tests of a modern model of the system on a KamAZ chassis were started at the Kapustin Yar proving ground. The Pantsir-S1 ZRPK tests were conducted during 2006-2007 at the Kapustin Yar and Ashuluk proving grounds in the Astrakhan region. Serial production of the ZRPK began in 2007. The Pantsir-S1 ZRPK was accepted into service with the Russian Armed Forces in 2008; the first ZRPKs were expected to enter service with the Air Force that same year (plans for 2007). In the spring of 2008, tests of the ZRPK were successfully completed, and by the fall, information appeared in the media that the first copy of the Pantsir-S1 ZRPK would be put into trial operation in the Russian Armed Forces by the end of 2008. As a result, the first batch of serial ZRPK "Pantsir-S" was transferred by the manufacturer (KBP, Tula) to the Russian Air Force on March 18, 2010 (10 units). Assembly of serial ZRPK is carried out by the pilot production of KBP - JSC "Shcheglovsky Val" (Tula). During 2010 and the following years, it is planned to deliver 20 ZRPK to the Russian Air Force (including 10 already delivered in 2010). In January 2012, information appeared in the media that by 2020 about 100 ZRPK "Pantsir-S" will be delivered to the Russian Air Defense Forces. On November 16, 2012, ZRPK "Pantsir-S" was officially accepted into service by the Russian Armed Forces. By default, the data of ZRPK "Pantsir-S1" model 2007. ★★★★

The combat vehicle of the Pantsir-S anti-aircraft missile and gun system after the parade on May 9, 2011 in Moscow (photo by Bomber, http://www.rusmed-forever.ru).

Author: DIMMI Created: 26.07.2011 21:57:12 Comments: 217 READ THE FULL ARTICLE

RT-2 / RT-2P / 8K98 - SS-13 SAVAGE

DATA AS OF 2025 (standard replenishment)
Complex 15P098, missile RT-2 / RS-12 / 8K98 - SS-13 mod.1 SAVAGE
Complex 15P098P, missile RT-2P / RS-12 / 8K98P - SS-13 mod.2 SAVAGE
★★★★

Intercontinental ballistic missile (ICBM). Development was carried out by OKB-1 (later renamed TsKBEM and NPO Energia) under the overall management of General Designer S.P. Korolev (since 1966 - V.P. Mishin), who was appointed Chairman of the Council of Chief Designers of the 15P098 missile system development program. The need to develop a solid-fuel ICBM RT-2 was first identified in Resolution of the USSR Council of Ministers No. 1291-570 of November 20, 1959 "On the creation of the RT-1 product and the implementation of work on the RT-2 topic", which provided for R&D of the RT-2 to determine the feasibility of creating and developing a preliminary design for a solid-fuel missile with a range of 10-12 thousand km and a warhead weight of up to 500 kg during 1959 - first half of 1961.

Direct development of the RT-2 ICBM was initiated by Resolution of the USSR Council of Ministers No. 316-137 of April 4, 1961, the leading designer of the missile was the deputy chief designer of OKB-1 I.N. Sadovsky, the leading designers at different times were S.E. Bardenshteyn and F.A. Titov. The same Resolution gave the start to work on the mobile complex with the RT-15 MRBM.

The development of various components of the rocket and the rocket complex was carried out by the following cooperative of enterprises:
- OKB-1 - the complex as a whole and the rocket;
- Leningrad State Institute of Applied Chemistry (Vladimir Shpak) - work on solid fuel on a polyurethane binder;
- Perm NII-130 (Research Institute of Polymer Materials, Leonid Kozlov) - third stage engine charge, fuel based on polyfurite;
- Lyubertsy NII-125 / NPO Soyuz (B.P. Zhukov) - fuel based on low molecular weight polybutadiene for the 3rd stage;
- Altai Research Institute of Chemical Technology (Chemical Technology) - first and second stage engine charges, fuel based on butyl rubber;
- SKB-172 - Perm Design Bureau of Mechanical Engineering (chief designer - M.Yu. Tsirulnikov) - first and third stage engines;
- TsKB-7 (Leningrad, chief designer - P.A. Tyurin) - second stage engine;
- TsKB-34 (Special Machine-Building Design Bureau, Leningrad, under the supervision of V.V. Chernetsky and E.G. Rudyak) - single-start silo launcher (OS silo) and command post;
- NII AP (under the supervision of Nikolai Pilyugin) - autonomous inertial control system;
- OKB Impuls (under the supervision of Taras Sokolov) - remote control and launch control system (RCLC, including aiming system).

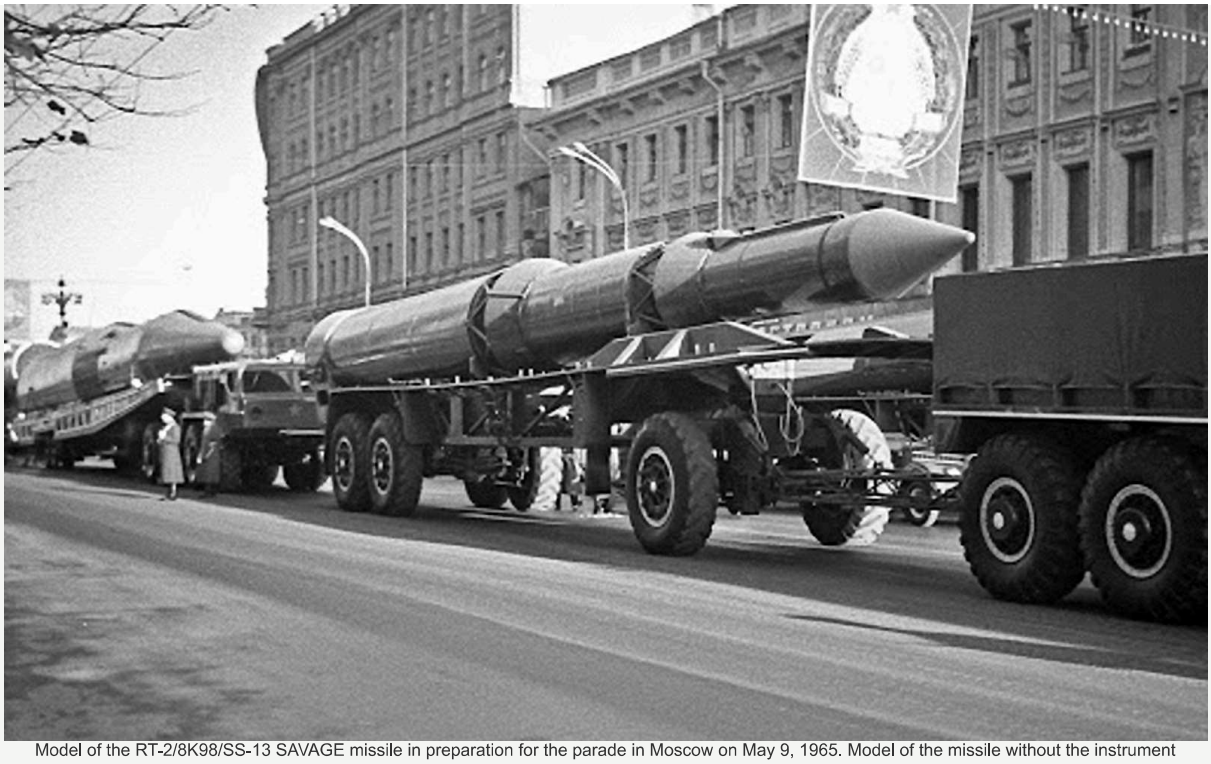
The use of RT-2 missiles was supposed to be from two types of silo launch complexes - group and single, as well as from a railway-based launch complex. During the development of the ICBM, only the version with a silo of the "single launch" ("OS") type remained.

The USSR Council of Ministers Resolution of June 29, 1962 specified the requirements for the missile and the timeframe for its development. A requirement was established to develop two versions of warheads and the requirements for missile accuracy and the ability to remotely control the launch were tightened. These requirements were consolidated by the Council of Ministers Resolution of July 16, 1963. At a meeting on August 22, 1963, it was planned to begin testing the RT-2 in the 4th quarter of 1964.

In 1963, a preliminary design for the RT-2 missile was released and in the same year, an experimental RT-1-63 missile was developed on the basis of the RT-1 missile to test solutions for the RT-2 ICBM, which was used to test the 3rd and 2nd stages of the RT-2 ICBM. A total of three missiles were built. Test launches of RT-1-63 missiles were conducted from the 8U258 ground launcher at the Kapustin Yar test site in the fall of 1965. Of the three launches, only one was successful.

Fire tests of blocks A, B, and V of the RT-2 missile were started in the summer of 1965. On July 15, 1965, a meeting was held with V.P. Mishin on the tests of blocks B and V of the 8K98 product. On July 16, 1965, the report of the emergency commission was reviewed, and on July 23, 1965, a meeting was held on the results of the emergency commission on fire tests of the RT-2 missile blocks.

For the first time, a model of the RT-2 missile with a simplified imitation of the warhead and without the instrument compartment was shown at the Parade on Red Square in Moscow on May 9, 1965.



Model of the RT-2/8K98/SS-13 SAVAGE missile in preparation for the parade in Moscow on May 9, 1965. Model of the missile without the instrument compartment and with a simplified warhead. In the background is the 8K66 missile (photo TASS, processed).

Author: DIMMI Created: 04.09.2016 20:05:37 Comments: 66 READ THE FULL ARTICLE

R-36M UTTH / 15A18 / RS-20B - SS-18 mod.4 SATAN

DATA FOR 2025 (standard update)
Complex 15P018, missile R-36M1 / R-36M UTTH / 15A18 / RS-20B - SS-18 mod.4 SATAN
★★★★

Third-generation intercontinental ballistic missile. The system and the missile were developed by the Yuzhnoye Design Bureau (Dnepropetrovsk, Ukraine), lead designer - S.I. Us. The development of the 15P018 system was assigned by the Resolution of the Central Committee of the CPSU and the Council of Ministers of the USSR dated August 16, 1976, as part of the improvement of the previously developed 15P014 system with the R-36M / 15A14 heavy liquid-propellant ICBM through the use of a new warhead stage and new combat equipment. The new ICBM was designed to destroy important high-strength small-sized targets located over an area of up to 300,000 square kilometers in the conditions of modern anti-missile defense with 10 warheads of one missile. The 15P018 launch system for the new ICBM was manufactured by KBSM with enhanced protection against PFYAV. The draft design of the system was submitted for defense in December 1976.

The increased efficiency of the 15P018 missile system compared to the 15P014 system was ensured by:
- increasing shooting accuracy by 2-3 times
- increasing the power of warhead charges (BB)
- increasing the area of BB breeding
- the use of highly protected silos and command posts
- increasing the reliability of transmitting launch commands to the silo.

During the development of the complex, the following cooperation of enterprises was formed:
Yuzhnoye Design Bureau (Dnepropetrovsk) - lead design bureau for the missile and the complex;
Yuzhny Machine-Building Plant PO (Dnepropetrovsk) - missile production;
Avangard PO - production of the transport and launch container;
Electrical Instrument Engineering Design Bureau (Khartron) - development of the missile control system;
Rotor NPO - development of the command instrument complex;
Arsenal Plant Design Bureau - development of the aiming system;
Energomash Design Bureau - development of the first stage of the missile;
Chemical Automation Design Bureau (OKB-154) - development of the second stage of the missile;
KBSM - development of the combat launch complex;
TsKBTM - development of the command post;
Prozhektor GOKB - development of the power supply system;
Impuls NPO - development of the remote control and monitoring system;
KBTHM - development of a refueling system

Serial production of 15A18 missiles was started by the Southern Machine-Building Plant in Dnepropetrovsk (Ukraine) in 1977.

Flight design tests of the 15A18 missile began with a launch on October 31, 1977 from a silo at the Baikonur test site and ended on November 27, 1979. During flight tests, 19 launches were performed at the 5th Research Institute of Testing in Baikonur (including 17 successful ones). The causes of two failures were the loss of stability of the first stage due to the failure of the steering machine and the loss of stability of the combat stage due to its incomplete separation from the second stage (the presence of a mechanical connection after the separation command). The causes of the deficiencies were eliminated, the effectiveness of the measures taken was confirmed by subsequent launches. A total of 62 launches were performed during the testing and operation of the ICBM, 56 of which were successful. The actual flight reliability of the missile, taking into account the modifications made at the flight test stage and taking into account the quality assurance of manufacture, is 0.965.

Launch of the Dnepr launch vehicle based on the 15A18/R-36M UTTKh ICBM, jettisoning of the support and leading belts (photo TASS)

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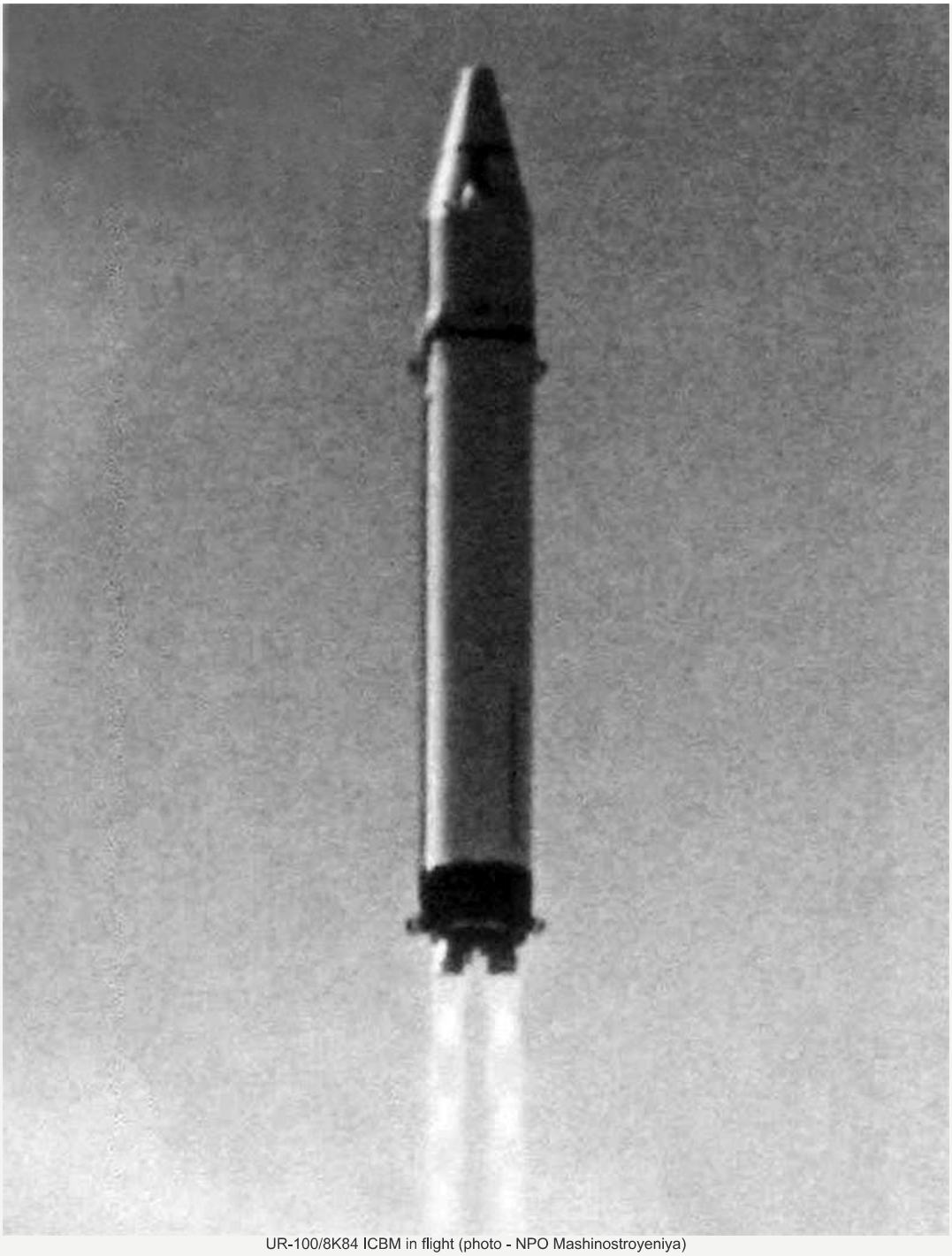
UR-100 / 8K84 / RS-10 - SS-11 SEGO

DATA AS OF 2025 (standard replenishment)
Complex 15P084, missile UR-100 / 8K84, UR-100 UTTKh (UR-100M) / 8K84UTTKh (8K84M) / RS-10 - SS-11 SEGO mod.1
Complex 15P084P, missile UR-100K / 15A20 / RS-10M - SS-11 SEGO mod.2
Complex 15P084U, missile UR-100K UTTKh (UR-100U) / 15A20U / RS-10MUTTKh - SS-11 SEGO mod.3
★★★★

Intercontinental ballistic missile (ICBM) / universal missile of the first series. The missile system with the UR-100 missile was developed by OKB-52 General Designer V.N. Chelomey. The first developments of the universal missile project date back to 1960. The UR-100 ICBM project was proposed by OKB-52 on February 11, 1963 at a meeting of the USSR Defense Council, which was held in Branch No. 1 of OKB-52. The development of the missile was proposed as a response to the mass deployment of missiles in the United States under the Minuteman program. Resolution of the CPSU Central Committee and the USSR Council of Ministers No. 389-140 on the creation of the UR-100 missile system with a simplified silo launch and an ampulized universal UR-100 missile was issued on March 30, 1963. The resolution stipulated the development of the UR-100 missile as a ballistic missile for hitting ground targets and as an anti-missile for the Taran anti-missile system . According to the original concept, the UR-100 ballistic missile was designed in two versions: intercontinental range with a light 8F121 warhead and medium range with a heavy warhead.

The missile complex was developed by the following cooperation of enterprises:
- the 15P084 complex as a whole and the UR-100 ICBM - OKB-52
- first stage cruise engines - OKB-154 under the supervision of S.A. Kosberg and A.D. Konopatov
- second stage cruise and steering engines - OKB-117 under the supervision of S.P. Izotov (now the State Research and Production Enterprise "V.Ya. Klimov Plant")
- the complex control system - NII-885 (NII AP) under the supervision of N.A. Pilyugin
- command devices - NII-944 under the supervision of V.I. Kuznetsov (now the Academician V.I. Kuznetsov Research Institute of Nuclear Physics)
- thermonuclear warheads - NII-1011 (now VNIITF)
- transport and launch container (TLC) - branch No. 2 of OKB-52
- launch complex - GSKB Spetsmash under the direction of V.P. Barmin
- silo protective device and installer - TsKBTM under the direction of N.A. Krivoshein (now the State Enterprise TsKBTM)
- pit-type command post - KB-1 TsKB-34 under the direction of E.G. Rudyak (now the State Enterprise Design Bureau of Special Machine Building)
- design teams headed by chief designers N.I. Zverev, M.S. Ryazansky, I.I. Kartukov and others were also involved.

The UR-100 missile was to become a light ampulized intercontinental mass missile with engines on high-boiling long-storable fuel components, which could be placed in protected silo launchers of a single launch (OS). The missile was to have a guaranteed service life of at least 5 years and maintain high combat readiness throughout its entire service life. The missile launch was to be controlled remotely.



UR-100/8K84 ICBM in flight (photo - NPO Mashinostroyeniya)

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R-7 / 8K71, R-7A / 8K74 - SS-6 SAPWOOD

DATA AS OF 2025 (standard replenishment)
R-7 / 8K71 - SS-6 SAPWOOD
Missile R-7A / 8K74 - SS-6 SAPWOOD
★★★★

Missile Intercontinental ballistic missile (ICBM) / satellite launch vehicle. The missile was developed by OKB-1 under the supervision of General Designer Sergei Pavlovich Korolev, lead designer - D.I. Kozlov. On 16.12.1949, NII-88 (S.P. Korolev) ordered from NII-4 the research work "Study of the possibility and feasibility of creating composite long-range missiles of the "package" type." The research was carried out by M.K. Tikhonravov's group and was completed in 1950. On December 4, 1950, by the Decree of the USSR Council of Ministers, a comprehensive exploratory research project was launched: "Study of the prospects for creating long-range ballistic missiles (LRBM) of various types with a range of 5-10 thousand km and a warhead weight of 1...10 tons." The following took part in the research work: OKB-1, OKB-456 (V.P. Glushko), NII-885 (M.S. Ryazansky, N.A. Pilyugin), NII-3, NII-4 (A.I. Sokolov), TsIAM, TsAGI (A.A. Dorodnitsyn, V.V. Struminsky), NII-6 (Vorotov), NII-125 (B.P. Zhukov), NII-137 (Kostrov) and NII-504 (Karpov), NII-10 (V.I. Kuznetsov) and NII-49, Steklov Mathematical Institute A.N. As a result of this research work, the fundamental possibility of creating composite IRBDs operating on kerosene and liquid oxygen, with a payload mass of 3...5 tons was proven. In 1951, NII-4 sent to OKB-1 a project for an experimental rocket, made using a packet scheme, capable of launching a satellite (*history - Gudilin*). After testing the RDS-6S

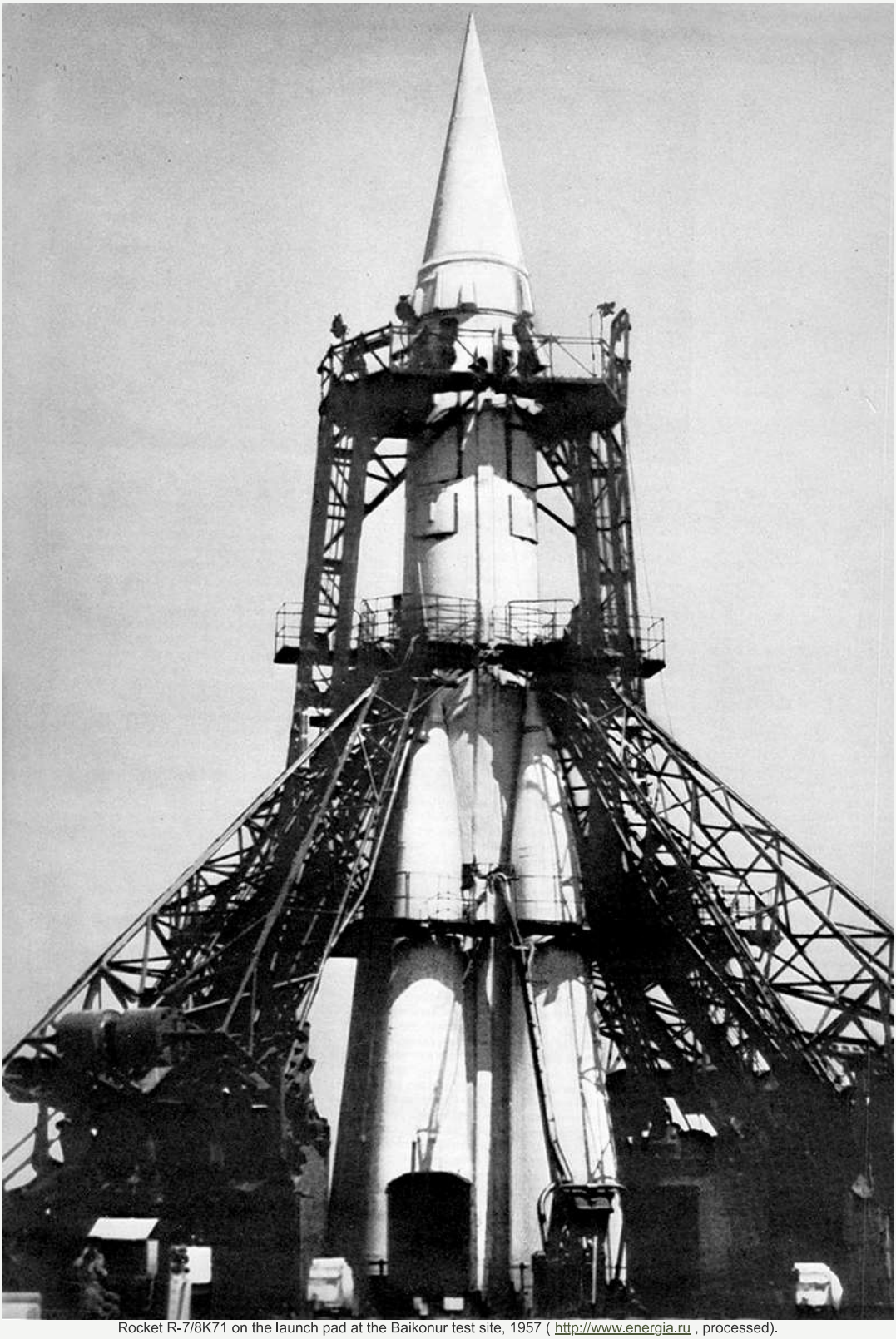
thermonuclear charge in 1953, which was the implementation of the ideas of A.D. Sakharov (KB-11), the Government in 1953-1954 raised the issue of creating a charge of this type for a ballistic missile and developing an intercontinental launch vehicle. By the Resolution of the Council of Ministers of the USSR of February 13, 1953, within the framework of research and development, topic T-I "Theoretical and experimental research on the creation of a two-stage ballistic missile with a flight range of 7000-8000 km" OKB-1 was ordered to develop a preliminary design for a two-stage ballistic missile weighing 170 tons with a separable warhead weighing 3000 kg with a range of 8000 km. In October 1953, the design assignment was changed - the mass of the warhead was increased to 3,000 kg (the total mass of the warhead of the missile was increased to 5,500 kg, the estimated range was reduced to 5,500 km) while maintaining the flight range. In January 1954, a meeting of chief designers S.P. Korolev, V.P. Barmin, V.P. Glushko, B.M. Konoplev, V.I. Kuznetsov, N.A. Pilyugin was held with the participation of M.I. Borisenko, K.D. Bushuev, S.S. Kryukov and V.P. Mishin, at which the issue of further work on the missile in

connection with the increase in the mass of the warhead was discussed. At the meeting, a decision was made to use a unified engine of relatively small dimensions for all blocks, limiting the dimensions of the blocks, allowing their transportation by rail. Due to the operating conditions, it was necessary to create stationary ground equipment with an unconventional method of suspending the missile on special discardable trusses, which made it possible to avoid loading the lower part of the missile when parked and to reduce its weight (*source - Gudilin*).

On May 20, 1954, the USSR Council of Ministers adopted a Resolution on the development, manufacture and testing of the two-stage 8K71 ICBM , made according to the package scheme with a range of 8000 km (*source - Kudryashov*). On June 28, 1954, the USSR Council of Ministers adopted a Resolution "On the R&D plan for special products", which specified the content, procedure and timing of work on the R-7 missile. On July 6, 1954, an Order was issued by the Minister of Defense Industry of the USSR on the commencement of work on the missile creation project. KB-11 (VnIIEF) was tasked with creating a thermonuclear charge with a capacity of at least 1.5-2 Mt of TNT equivalent.

On July 24, 1954, OKB-1 completed the development of the preliminary design of the 8K71 ICBM, which was approved at the end of July 1954 by the interdepartmental commission headed by M.V. Keldysh and on November 20, 1954, approved by the USSR Council of Ministers (*history - Gudilin*). In August 1954, OKB-1 issued technical specifications to subcontractors for the development of systems and units of the 8K71 missile (history). S.P. Korolev approved the theoretical drawing of the R-7 missile on March 11, 1955, and on July 25, 1956, the materials of the revised preliminary design were signed. The development of design documentation for the R-7 missile began back in 1953 (history).

The technical design of the R-7 missile was to be presented in the first quarter of 1956, the missile testing site was to be prepared no later than April 1956, and the planned start date for sighting and qualification tests was set for the second quarter of 1957. The first launch of the R-7 missile was planned for late 1956 (report to the Presidium of the Central Committee of the CPSU dated 03.02.1956 source).



Rocket R-7/8K71 on the launch pad at the Baikonur test site, 1957 (http://www.energia.ru , processed).

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